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Gas Journal

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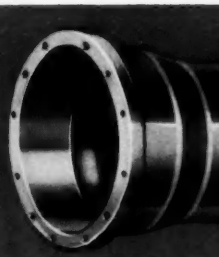

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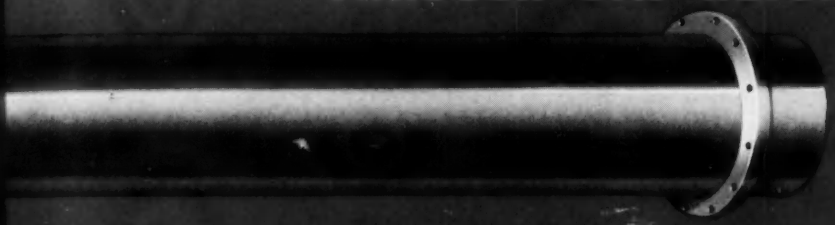

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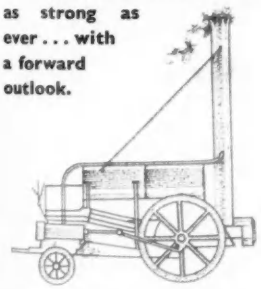

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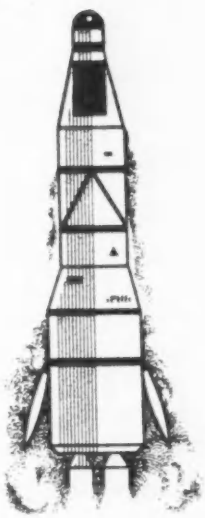

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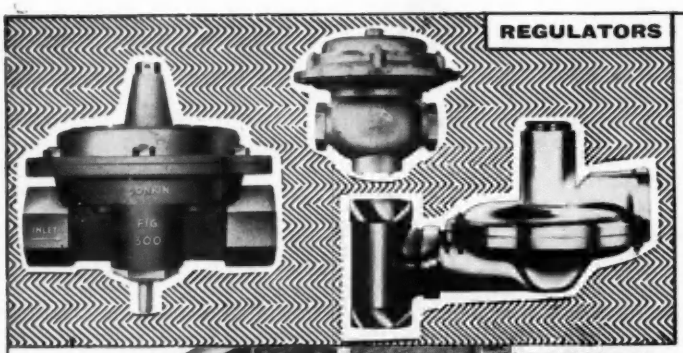

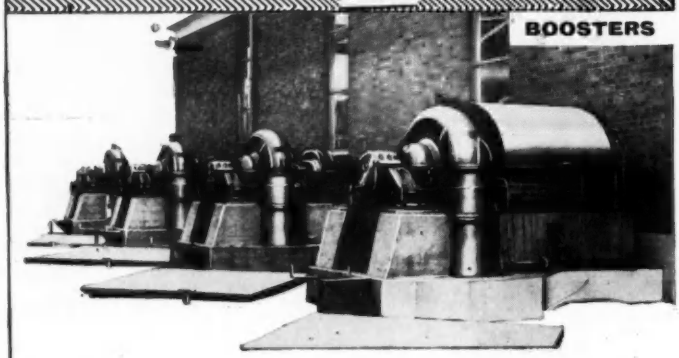

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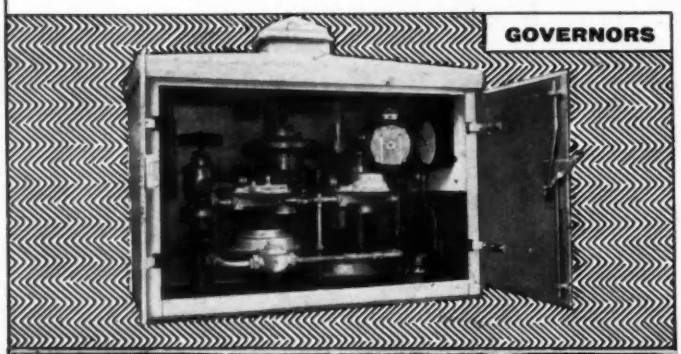

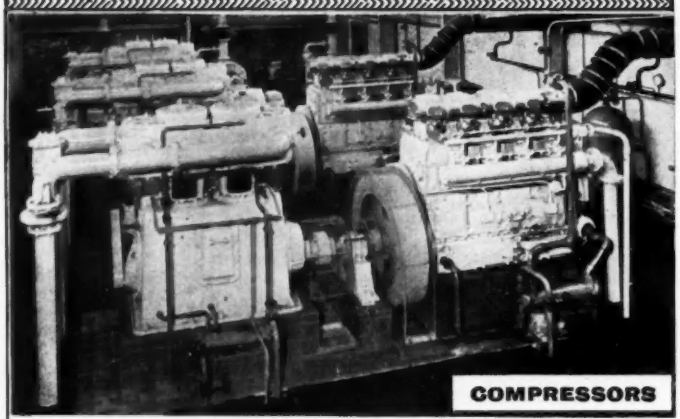

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Gas Journal

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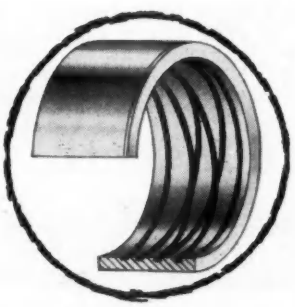

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Lessons from America

IT is, we suspect, a source of irritation to the average Britisher that, in many fields of activity, what the United States is doing today, Britain will be doing tomorrow. How often have we read of some practice or fashion which is sweeping America and thought, as we shook our heads in baffled disgust, thank Goodness that could never happen here; only to find, a year or two later, that it has! It has happened with such diverse things as hire purchase, hula hoops, popular music and canned beer. The motor car industry, although perhaps giving more attention to Continental practice, continues to keep an eye on the barometer of American trends. The world of male fashion owes much to American style, and the brownish tweed mixtures and the narrow ties which are becoming increasingly common in this country bear witness to the fact. The domestic appliance is particularly influenced by American developments, and so of course it behoves the British gas industry to keep a watching brief on what is happening across the Atlantic.

One of the most gratifying aspects of nationalisation is the fact that funds can be found to permit fact-finding visits to be made abroad, and there is every reason to suppose that those trips which have been made by British gas engineers have paid off handsomely in terms of information on new techniques and fresh ideas. In the last year or two the emphasis seems to have been on new gas production methods and high pressure distribution techniques, while the study of the domestic markets has been left to representatives of the appliance manufacturers. However, a notable exception was the recent visit to Canada and the United States of three men whose efforts to improve standards in gas utilisation are so well known in the industry that they may be said to have come out of the backroom and into the parlour! We are of course referring to Dr. F. J. Eaton, Deputy Manager of Watson House, Mr. D. R. Wills, also of Watson House, and Mr. G. H. Fuidge, Manager of the South Eastern Gas Board's Central Laboratories, whose joint paper ' Some Impressions of the Domestic Use of Gas in the United States and Canada ' was one of the high spots of the last Institution meeting.

The main purpose of this three-man trip was to investigate space heating practice, but in the course of the team's discussions with 35 different organisations a wealth of valuable information was gathered on American housing, conditions of gas supply, appliance testing, control devices, and various domestic uses to which gas is put in the North American continent. The authors' approach was essentially ' technical,' but this very readable account of their travels indicates a breadth of vision extending far beyond the somewhat narrow confines of the laboratory bench, and a sharp awareness of the purely commercial aspects of the American industry. It is with the latter side of their findings that we are now concerned.

It need hardly be said that, despite the startling similarities in problems and their solution, conditions of supply in America are vastly different from those in this country. In all except a few small areas the gas supply is natural gas of about 1,000 B.t.u. per cu.ft. and consisting of over 90% methane. It is non-toxic and in most cases almost sulphur-free; above all it is cheap. What may not be fully appreciated in this country is that the largest use for gas is for space heating and that in 1958 the house heating load had reached nearly 64% saturation for the entire United States. In Chicago domestic customers with space heating have an average consumption of some 1,700 therms and customers without space heating some 350 therms. It is rather shattering to realise that the total gas consumption for the Peoples Gas Light and Coke Company and associated companies is 4,500 mill. therms, compared with 2,800 mill. therms for the whole of the British gas industry!

Three types of American house mentioned by the authors are the ' ranch ' type, the ' split-level ' (both with basements) and the ' slab ' house, which is a single-storey structure on a concrete raft. Open and semi-open plans are usual and kitchens are elaborate with a fashion for built-in cookers. Central heating, it appears,

is found mainly north of the Mason-Dixon Line, while in the south the traditional independent room heating continues. Even in northern cities about 50% of gas space heating is still in the form of independent room heaters chiefly of the convector type. The central heating systems are divided into 65% by warm air methods and 35% by hot water; the preference for the warm air type is attributed mainly to the lower capital and installation costs (about half that of the hot water system) and also to the convenience of installation in the basement type of dwelling. A further factor is the expansion of air conditioning in the summer, which is regarded as essential for offices, but which is now extending even to homes. A fact which surprised the authors was the growing popularity of direct electric heating in the south-central and southern states—despite the fact that the cost of electricity is 2.5 to 3.5 times that of gas.

Shortage of engineers

There is an interesting comment on the shortage there, as here, of competent engineers to deal with design and installation problems associated with warm air heating. The installer, it appears, relies on simple design charts and tables and uses standard fitments and ducts provided with balancing dampers. This practice is helped by the similarity of house design and the availability of package units. Complaints are dealt with by a more experienced and skilled engineer. The authors point out that with selective warm air systems skilled design is seldom necessary, but that if the development leads to a wider application of whole-house warming systems in this country, attention to more detailed design will be necessary. In the modern homes the air is distributed by the ' perimeter ' system in which the delivery is at low level near the outside walls; it is felt that in time such methods will be of importance in this country, despite the higher running cost. The paper gives a great deal of precise information on the variety of heaters available and their performance.

In America the main interest in hot water methods of central heating is directed towards perimeter baseboard systems, and the conventional radiator is on the way out. Contrary to British practice the domestic ' hydronic ', or hot water, systems employ the ' closed ' principle with a hot water circulator temperature of about 215°F. which permits the use of smaller radiator surfaces.

Air conditioning

The authors devote a particularly interesting section to air conditioning, an industry which is fast developing. Apparently two basic systems are available—absorption and vapour compression—the former being the system on which the application of gas mainly depends, but the latter being the more efficient. However, the authors remark that large absorption plants may show to advantage where the load factor is small and the use of the plant intermittent, and they mention a type of air conditioner which integrally includes the gas-fired steam boiler for providing the heat necessary for the absorption cycle; at present there are only two sizes, 3½- and 5-ton units. Comparison between gas- and electrically-driven vapor compression plants suggests that the capital costs for the gas-driven plants are higher, servicing costs are higher and noise problems are greater. Summarising, the authors conclude that, even in the U.S.A. where gas enjoys a very strong price advantage, gas air conditioning is only getting a very small share of the market. They feel, therefore, that in Great Britain where gas has a very poor price comparison, it cannot compete for larger units of commercial application except in special cases such as use in small public halls, restaurants and so on. They report that one or two firms of American origin are exploring the possibility of a market in this country for gas air conditioning units of 3½ and 5 tons capacity with integral boiler and gas burner.

The British gas industry has, during the past two or three years, given a good deal of thought to the possibility of building up an incineration load. It is interesting, therefore, to note the authors' review of the present position in the States. There gas-fired incineration has been much more extensively applied, both in the form of individual domestic incinerators and for bulk incineration by flue- or duct-fed incinerators in blocks of apartments and office buildings. Bulk destruction would seem to be the preferred method and there are at present some 11,000 flue-fed incinerators in New York alone. Sales of small independent incinerators were hampered by disapproval resulting from their lack of afterburners, but the use of the present smokeless models is expected to be extended.

Another use for gas which is receiving active thought in this country is the tumbler dryer, and the authors comment that although this appliance may not find such ready application in the average English home as in the more spacious American one, there are real possibilities in communal drying rooms in flats, hostels and the larger homes.

The cooker load

At a time when we are giving a lot of attention to retaining and improving the cooker load it is perhaps a little disappointing that the paper deals only briefly with this important subject. However, one learns that much business has been lost to electricity, due perhaps to the gas industry lagging behind in modernising gas ranges (sounds familiar!) but that most American cookers have at least one hotplate burner with a thermostatic head and—most interesting this—one of the duplex type. The authors suggest that the latter type of burner, which permits a very low turn-down, could with advantage be reintroduced on British cookers to solve the problem of simmering. Automatic ignition on the hotplate is at all rates using secondary pilots and it is now obligatory that all cooker ovens be fitted with automatic ignition and a safety device.

The paper will be read with keen interest by all those who are concerned with ways in which the British gas industry can enlarge its business. The extent to which American experience gives a foretaste of what we may experience in this country is of course debatable. Our guess is that a number of the trends and developments described so competently in the paper will in due course become a part of the British gas scene.

World's largest single unit carburetted water gas plant

By G. MILNER,
PH.D., M.I.GAS E., POWER-GAS CORPORATION, ENGLAND,

and

N. G. MATHER,
M.I.GAS E., AUSTRALIAN GAS LIGHT COMPANY, SYDNEY.

THE Power-Gas Corporation (Australasia), Pty. Ltd., a subsidiary of the Power-Gas Corporation of Stockton-on-Tees, have just completed the acceptance tests for the world's largest single unit carburetted water gas plant. With a guaranteed capacity of 9 mill. cu.ft. per day of 550-c.v. gas, it is capable of a peak load capacity of over 12 mill. cu.ft. per day.

The decision to erect this unit followed an extensive investigation into the economics of various alternative proposals for increasing the gas-making capacity of the Mortlake works of the Australian Gas Light Company, Sydney, Australia; its specification required:

1. Continuous base load production of carburetted water gas with a calorific value of 550 B.t.u. per cu.ft.
2. Completely automatic operation, including ash discharge, with a minimum of operating labour.
3. Complete automatic control and instrumentation to ensure continuous maximum efficiency of operation.
4. Future adaptation to handle bunker C gas-making oil with a Conradson carbon of 7.0.
5. An indication by the tenderer of the potential maximum thermal output, and that the ancillaries should be capable of handling such an output.

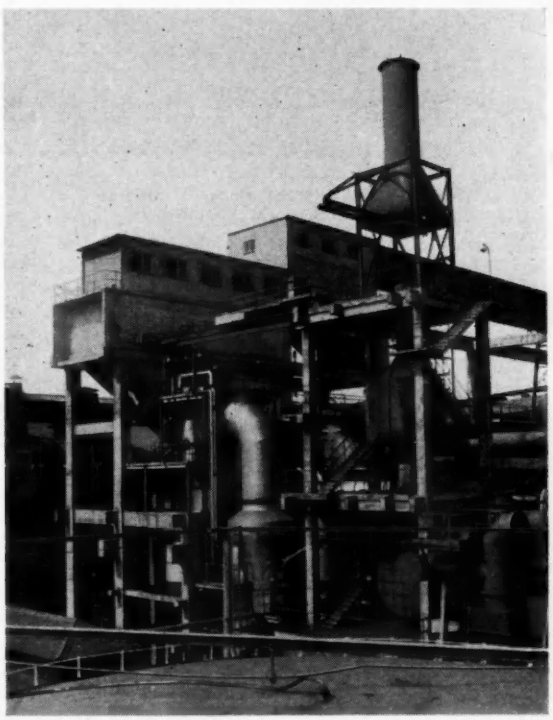
Except for starting up, the unit is nearly self supporting in its steam requirements.

Opened by Premier

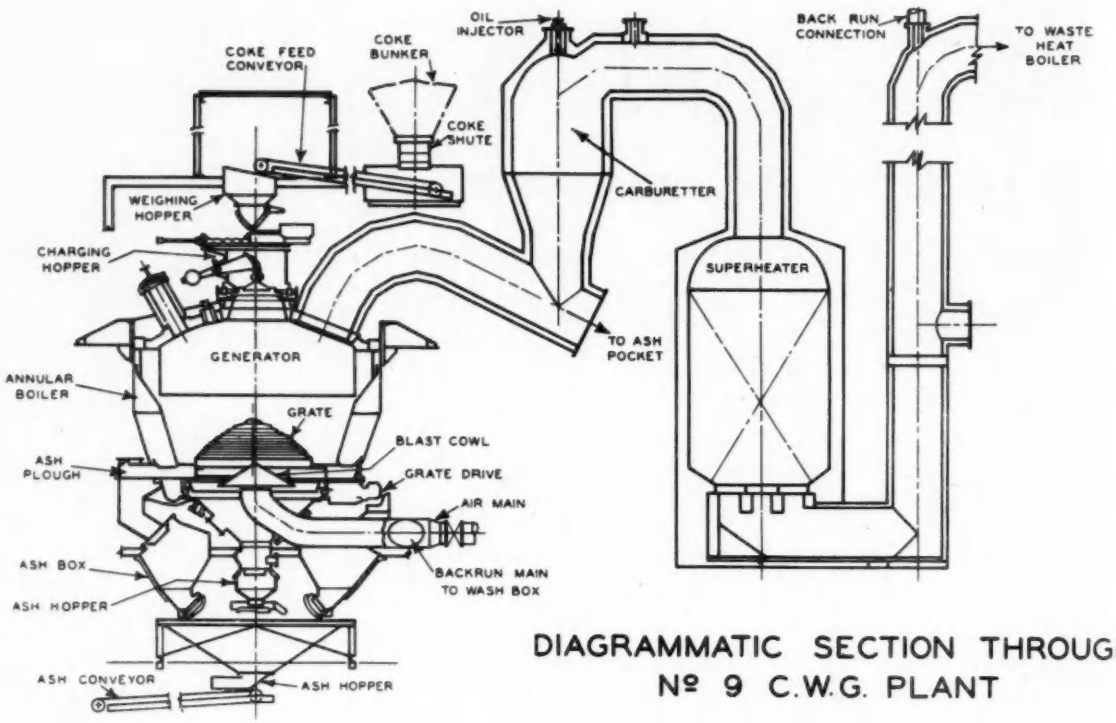
Instructions to proceed with the project were issued in March, 1959, and the unit was gas-making in October, 1960, the plant being officially opened by the Premier of New South Wales.

Special equipment, machinery, valves, the hydraulic installation, instruments and controls were obtained from Britain. All structural work, refractories, electrical and steam systems, the tar system and tar storage, the generator boiler, the waste heat boiler, the accumulator, the relief gasholder, gas mains, the ash handling plant and similar items were obtained from Australian sources. This not only minimised cost but also saved time. With so large and complex a project, its completion within the time mentioned was noteworthy.

There have been several interesting developments in the



General view showing the upper portion of the concrete structure, crane gantry, main stack, dust cyclone and waste heat boiler of the single unit carburetted water gas plant in Australia. The 100-ton concrete coke storage hopper is at the left.



DIAGRAMMATIC SECTION THROUGH Nº 9 C.W.G. PLANT

design of this plant, among the most outstanding of which are:

1. An interlocked and automatically timed ash pocket discharge from the dry seal generator. The ash pockets are discharged at predetermined cycle times on to a belt conveyor delivering to an overhead ash storage hopper. (Note: A dry seal type generator was adopted because of its major advantages in respect of potential gas output capacity and simplicity.)

The automatic ash discharge system also provides for automatic discharge of the grit fliers from the carburettor and from the stack cyclone.

2. The unit is carried on a reinforced concrete structure and is built completely in the open, except for the control and instrument room, which is physically isolated from all other structures to minimise vibration; it is air conditioned.

3. The special design of the carburettor makes possible a very high oil-cracking capacity. The oil cracking efficiency is also of a high order.

4. The automatic probing and regulation of generator fuel requirements, through a controlled weighbridge.

5. There is completely automatic control of the exhauster from the relief holder, which was specially developed for the plant.

6. The centralised recording and remote operation of the detarrer and purifier air revivification.

7. A lift with landings at four levels providing easy access for the operating staff.

8. An overhead crane serving the main part of the plant to facilitate maintenance.

Under the terms of its guarantee, the unit was required to produce continuously 9 mill. cu.ft of carburetted water gas of a calorific value of 550 B.t.u. per cu.ft., when using an oil with the following characteristics:

Specific gravity	.890
Pour point	85°F.
Kinetic viscosity at 100°F.	9.0 centistrokes
at 122°F.	6.5 „
at 140°F.	4.9 „
Closed flash point	207°F.
Conradson carbon	.7%
Ash content	.05%
Aromatic hydrocarbons	28.6%
Unsaturated hydrocarbons	2.0%
Naphthenes	8.8%
Paraffins	60.6%
Carbon-hydrogen ratio	6.82%
Calorific value	19,400 B.t.u. per lb.
Distillation—	°F.
5%	490
20%	530
50%	625
70%	720
80%	750

The coke derived from vertical retorts carbonising Lower Greta seam Maitland coals was defined as having the following characteristics:

Fixed carbon	83.9%
Volatile matter	1.6%
Ash	14.5% (dry basis)
Moisture	10% by weight as charged
Screening analysis	
Retained on 2½ in.	7%
„ „ 2¼ in.	12%
„ „ 2 in.	27%

„ „ 1¾ in.	47%
„ „ 1½ in.	66%
„ „ 1¼ in.	79%
„ „ 1 in.	92%
„ „ ¾ in.	99%

Variations in output corresponding with variations in carbon content, moisture content and screen analysis were required to be stated by the tenderer.

The plant was designed so that the necessary modifications could be made to it at some future date to enable it to use Bunker C oil with the following approximate characteristics:

Flash point (Pensky-Martene) to be greater than 150°F.

Viscosity (B.S. standard U viscometer)—not more than 35 centi-stokes at 140°F.

Pour point (A.S.T.M.) not more than 85°F.

Carbon residue (Conradson crucible)—not more than 7.0% by weight.

Sulphur—not more than 2.5% by weight.

Distillation test (standard Engler)

1. water—not more than .5% by weight.
2. residue after distillation at 680°F—a high proportion of non-volatile residue is undesirable.
3. general—foreign matter including grit and fibre to be not more than .1% by weight.
4. acidity—the oil shall be free of mineral acids.

The oil used for the acceptance tests was practically identical with the specification set out, but the grading analysis of the coke fuel was slightly less. Adjustments for variations in fuel and oil were made in determining the guarantee performance.

The average guarantee performance of the unit, over the required period of seven days was:—

Gas—9.7 mill. cu.ft. per day.

Quality—(inlet purifiers)—555.2 B.t.u. per cu.ft.

Therms—(inlet purifiers)—55,893 per day.

Gas analysis (ex plant).

CO_2	=	5.6%
C_nH_m	=	9.0%
O_2	=	.2%
CO	=	31.7%
H_2	=	41.7%
CH_4	=	8.2%
N_2	=	3.6%
C.v.	=	560 B.t.u. per cu.ft.
Sp. gr	=	.656
Organic sulphur	=	9.3 grains per 100 cu.ft.
H_2S	=	170
Condensibles	=	1.62 ml. per cu.ft.
NO (outlet purifiers)	=	.13 ppm.

Carbon gasified per 1,000 cu.ft. of gas made = 26.39 lb.

Oil used (gal. per 1,000 cu.ft. c.w.g.) = 2.74

Process steam used = 53.03 lb. per 1,000 cu.ft. of gas made.

Steam generated = 46.61 lb. per 1,000 cu.ft. of gas made.

Peak load capacity (gas output), 36-hour test.

Gas	12.056 mill. cu.ft. per day.
Quality	543 B.t.u. per cu.ft.
Therms	65,478 per day.
Oil used	2.94 gal. per 1,000 cu.ft.
Fuel used	28.95 lb. per 1,000 cu.ft.
Process steam used	47.5 lb. per 1,000 cu.ft.
Steam generated	36.4 lb. per 1,000 cu.ft.

Maximum thermal capacity, 24-hour test.

Gas	11,686 mill. cu.ft. per day.
Quality	600 B.t.u. per cu.ft.
Therms	70,116 per day.
Oil used	3.52 gal. per 1,000 cu.ft.
Fuel used	29.9 lb. per 1,000 cu.ft.
Process steam used	40.4 lb. per 1,000 cu.ft.
Steam generated	41.3 lb. per 1,000 cu.ft.

The detailed design of the new generator at the Mortlake works stems from experience gained by the Power-Gas Corporation on large units over a period of 35 years.

Large, dry base generators employing ash boxes mechanical ash discharge and jacket boilers were designed for Synthetic Fertilisers and Chemicals Ltd. at Billingham, in the early 1920's.

By 1929 generators 13 ft. diameter at grate level and 15 ft. diameter at the top of the firebed were successfully gasifying unscreened coke oven coke, with high rates of blowing and at blast pressures over 60 in.w.g.

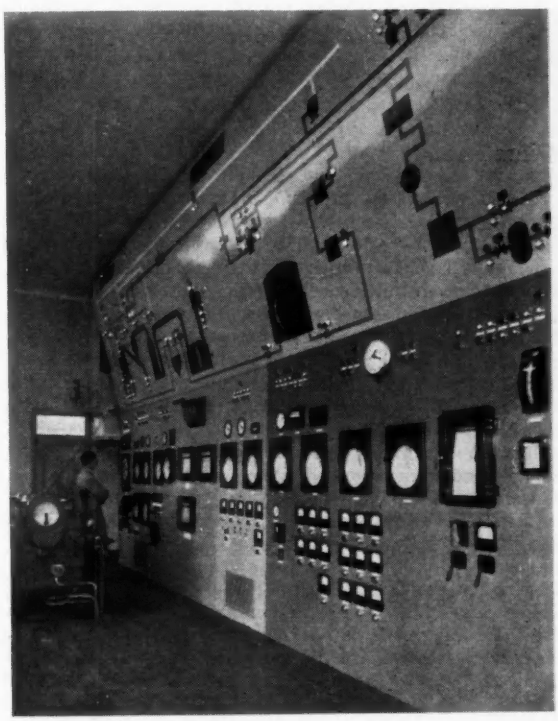
To minimise carry-over of the smaller particles in the unscreened coke, the generators were tapered, with the top wider than the bottom.

Restricted generator ratings

With unscreened coke, generator ratings were restricted, but by 1939 with well screened coke, outputs of the order of 7½ mill. cu.ft. per day of semi-water gas were obtained from generators fitted with grates of no more than 10 ft. diameter. These units were gasifying up to 95 tons of coke per day.

Because of limited demand, application of the large dry-base generator to the manufacture of carburetted water gas did not develop as rapidly as did its application to synthesis gas manufacture, but there were a number of such plants built in both North and South America immediately after the second world war.

In 1950, the North Thames Gas Board decided to install at its Beckton works three large generators, initially rated



The automatic operator, graphic indicator panel and control instruments. The control room is air-conditioned and is structurally separated from the plant itself.

at 6 mill. cu.ft. per day of c.w.g. of a calorific value of 510 B.t.u. per cu.ft., though these units were subsequently up-rated during the design stage to 8 mill. cu.ft. per day. By the year 1956, improved operating techniques had made possible outputs up to 9 mill. cu.ft. per day. With an inside diameter of 11 ft. 6 in. and fitted with jacket boilers, these generators were equipped with hydraulically operated mechanical grates and ash boxes.

Improvements effected in the ten years up to 1950, both in the construction and contour of the grate as well as in the method of operation were also incorporated in the units installed at Beckton.

Parallel with these improvements in generator design, were the developments in new carburettor designs carried out in America by the Semet-Solvay Corporation, incorporating the 'chequerless carburettor', which is particularly suited for the gasification of the heavier less mobile oils, rich in Conradson carbon.

'Reverse flow' technique

In addition the 'reverse flow' technique together with 'opposed oil injection', in which gases flow upwards through the carburettor and downwards through the superheater, has also developed. When applied at Beckton it proved itself capable of gasifying the standard type of gas oil just as efficiently as the older forms of chequered carburettor and superheater with downward flow through the carburettor and upwards through the superheater.

A feature of the chequerless carburettor at Beckton was its ability to trap coarse particles of coke blown from the fire, and so prevent them from passing onwards through the superheater and waste heat boiler, but performance was not as satisfactory as desired.

The tangential entry of the blow gases into the dust chamber of the carburettor caused a significant amount of abrasion and the formation of finer particles of coke, and furthermore, the large empty space was difficult to purge with the consequent nitrogen content of the c.w.g. of the order of 10%.

Glass models

To overcome this problem for the Mortlake plant, a laboratory scale design study was begun early in 1959, employing accurately scaled glass models through which water containing bubbles of air was observed and photographed; six models were studied before the design was finalised. As a result the large dust chamber and the use of centrifugal force to separate the particles was abandoned, and replaced by a system developed in 1943-44 as part of the earlier chequerless carburettors supplied in the United Kingdom. By a sharp change of direction of the blow gases, the coarse dust particles are caught in an 'elephant's trunk' in which the separated particles could settle and remain undisturbed until discharged from the plant. The model studies showed that this method also eliminated an undesirable vortex which had rendered purging difficult. To improve the purging at Beckton an extra 'high duty' purge steam supply was added, a feature also incorporated into the Mortlake plant.

The value of the work with the models was proved during the acceptance trials carried out on the new unit at Mortlake, when with normal purging the nitrogen content of the c.w.g. was as low as some 3½%, and with only two seconds of 'high duty' purge could be reduced below 3%.

The coke available at Mortlake is of low bulk density and is somewhat friable, and therefore would not tolerate a high blast velocity at the top of the firebed without excessive 'carry over,' so a grate diameter equal to the Beckton units was decided upon, but with the generator tapered in accordance with the practice established at Billingham prior to 1930.

The diameter chosen for the top of the firebed was 4 ft., corresponding to a somewhat smaller generator operating in England on light friable coke graded to an average size of 1¼ in. The design of the generator top and the gas off-take was generally similar to that of a generator of 15 ft. in diameter, put to work in 1929, and still successfully operating.

Experience gained since 1950 on oil gasification units, both of the catalytic and non-catalytic types, had shown the value of central entry of the blow and run gases to the superheater, so in this respect the design of the Mortlake plant in being able to include this modification differed from the large units at Beckton, and it is believed that such a superheater functions even more efficiently than did those at Beckton.

The Lockheed hydraulic equipment for control valve operation, the coke charging equipment, and the safety interlocking system, fitted to the Mortlake plant are basically the same as has been used during the past 15 years and therefore call for no special comment.

However, one item of design of special interest, which was undertaken specifically at the request of the Australian Gas Light Company, is the cyclic ash discharger employing double doors in the ash boxes; and is the first Power-Gas generator to be so equipped. Though it has proved successful when the ashes are well granulated, work still remains to be done to ensure complete reliability when the ashes are powdery and difficult to fuse.

Steam pressure

High pressure superheated steam is raised in the waste heat boiler and used for the blower and exhauster drives, which exhaust at a pressure similar to that in the jacket boiler into a steam accumulator; this l.p. steam is then used for process work. An Askania regulator ensures a definite predetermined process steam pressure.

By an arrangement of pressure control valves, any low pressure steam available over and above process requirements at any time, is passed back to other gas-making plants on the works. Both high and low pressure boilers are equipped with an automatic continuous blow down system. Periodic manual blowdown may also be used.

The gas is cooled in primary and secondary condensers of the vertical tube multi-pass type. Cooling water is in a closed system incorporating an induced draught cooling tower designed by Head Wrightson & Co. Ltd.

The water circuit is operated by a single pumping unit with pressure conditions for the water in the condensers. The temperature of the cooling water is automatically adjusted by the fan operation. After cooling and before purification, the gas is passed through a Simon Carves detarrer and a naphthalene scrubber. Low density high surface area oxide purification is practiced in conventional purifier boxes with controlled admission of revivification air and suitable box rotation.

Glass working lathe for university

The Scottish Gas Board has just supplied special fittings for the latest acquisition to Edinburgh University's Biochemistry Department—a glass working lathe, for making its own gas apparatus.

Edinburgh University is the only university in Scotland, and probably only the second in Britain, to make its own glass apparatus.

The 'Gas Journal' continues a review of the technical sessions at the 8th Conference of the International Gas Union, held recently in Stockholm, Sweden, in the following pages—

IGU SWEDEN—
'Gas Journal' Abstract

SECTION 2

Review of Technical Sessions

IGU/11-61 Network Analysis of Gas Distribution Systems.
Paper by James C. Challis, Australian Gas Light Company, N.S.W., Australia.

IGU/34-61 The Significance of Gas Quality and Pressure to Distribution and Utilisation Techniques.
Paper by A van der Linden, of the Gasinstituut der Vereniging van Exploitanten van Gasbedrijven, Netherlands.

IGU/33-61 Gas Leakage Detection by Dogs.
Paper by J. van Dam van Isselt and J. G. de Voogd, Netherlands.

IGU/6-61 An International Enquiry on the Cathodic Protection of Gas Pipelines.
Report by the German Association.

IGU/43-61 Town Gas from Coke Oven Plants in Czechoslovakia.
Paper by S. Odehnal, Vice-director of General-Verwaltung Gas, Czechoslovakia.

NETWORK ANALYSIS

THE need for proper engineering design for the extensions of distribution facilities requires an accurate determination of flow distribution in both the existing and proposed systems. The flow of gas in a single pipeline is related mathematically to the pressure drop in the pipe, the physical dimensions and the roughness of the pipeline. When a multi-branched system supplies a demand for gas through several interconnected routes, the labour involved in the evaluation of flows and pressure drops—if manual techniques are employed—is very long and tedious. Automatic computer procedures, however, improved the accuracy and vastly increased the speed of the calculations.

The formula chosen by The Australian Gas Light Company includes an allowance for pipe friction varying with flow, so that

$$P = R\ Q^{1.85}$$

where P is the pressure drop in the pipe section, R is the resistance, which is a function of the dimensions and roughness of the pipe, and Q is the flow into the pipe.

It is applied using a modification of the Hardy Cross method. Pressure drops in pipelines are calculated from estimated flows, and the sum of pressure drops around closed loops in the system (ideally zero) is evaluated. Correction flows to the loops are calculated so as to bring the unbalanced pressure drop to zero. The correction flows are subtracted from the original assumed flows to give improved estimates.

Corresponding corrections subsequently performed on adjoining loops with common pipelines, will have the effect of introducing imbalances to each other. The correction flows for loops in the system as a whole converge rapidly and it is normal to stop this computation as soon as all unbalanced pressures in the loops become smaller than an arbitrary figure representing the practical limit of significant measurable pressure.

The Australian Gas Light Company have made two important modifications to the method as generally adopted. They are:

1. Where there is a change in pipe resistance caused by the flow entering a pipe being absorbed by customer demand, distributed along the length of the pipe, and particularly where flow enters at both ends of a pipe, and all of the gas is used by the customers attached to that supply, these changes are detected and included in the analysis automatically.

2. Pressure drops in individual pipelines are connected together by the programme to give pressures at selected points in the network. Pressure drops in all pipes are weighted by the area of surface of the pipes involved and a weighted system mean pressure is formulated to act as a comparison with alternative networks. All pressures given in this section of the work are corrected so that the minimum pressure point in the system is supplied with a safe pressure.

GAS QUALITY AND PRESSURE

In the last ten years the introduction of petroleum products has brought a marked, fundamental change in gas supply methods, so in the near future, and probably for a long time to come, the distribution and utilisation of gas will be dominated by problems caused by the diversity of gas quality.

The diversity in the chemical compositions of gaseous fuels merits a closer study of certain techniques of distribution and appliance design but certain recommendations of the author are helpful.

The unit of volume as a basis for all calculations should be replaced by the unit of heat, the Wobbe number should be accepted as the sole criterion for distinguishing gases for distribution and utilisation.

The gas pressure at the inlet of an appliance plays an essential part in the operating of that appliance, so the factor $\frac{\sqrt{p}}{W}$ the 'gas modulus m'—is an essential criterion for appliance operation. All gases should therefore be distributed at the same Wobbe number and the same pressure, but where this cannot be applied the gas modulus should be maintained at a sufficiently high value to achieve suitable combustion properties.

In the case of the radical solution (constant Wobbe number for all gases), the technique of constructing appliances in general depends solely on the technique of flame stabilisation and aeration. Should one wish also to widen the applicability of burners to gases of different Wobbe number and the same gas modulus m, one has moreover to adapt the appliances by changing the injector. In general, this solution forces one to change over to bunsen-type burners.

The theory of burner aeration forms the basis for calculating the possibilities of adapting appliances to use gases of different Wobbe number and pressure.

Variations in the calorific value of gases for which the Wobbe number is maintained at a constant value are not such as to present difficulties for the thermal pricing of gas.

For large industrial consumers, the measuring of thermal delivery by flow meter, without correction for density, is the most suitable method.

The development of a domestic gas meter based on the same principle is an important task for gas engineering technology.

DISCUSSION

MR. L. W. ANDREW (Great Britain) agreed that the design of a 'universal' burner was an ideal target, but it became a question of the extent to which the burner should be designed to be modified as required for use with a diverse range of gases or whether the production of the gas should be modified so that it was interchangeable for the burner.

The burners of new appliances could be designed to be more flexible but one still had the problem of modifying all the burners of existing appliances (for example on 2 mill. gas cookers in the U.K.) if the gas were not interchangeable. His final comment was that the ideal target was an interchangeable gas.

MR. P. DELBOURG (France) agreed with Mr. van der Linden's recommendations in theory but considered that there were many practical difficulties in introducing a universal burner which would have the desired tolerances.

He accepted the constant Wobbe number as the correct basis for a universal burner but did not agree that other parameters could be excepted; allowance must be made for quality changes.

Mr. van der Linden replying to Mr. Andrew's comments, said he had not considered so much how gas production might be changed, but how appliances must be changed to be universal and he stressed the importance of the Wobbe number. He agreed with Mr. Andrew's last remark, the ideal would be to have one kind of gas and then the non-aerated burner could keep its place.

In reply to Mr. Delbourg, he explained that in stating that the Wobbe number and supply pressure were of basic significance he had not intended to imply that other properties did not affect performance, or that they could be neglected, but that they were of secondary importance.

CATHODIC PROTECTION OF PIPELINES

This report followed an inquiry carried out for the IGU by a committee of the German Association. It records that cathodic protection has been practised to varying degrees in the United States and Belgium since about 1930, in the Soviet Union, France and the Netherlands since 1946, and in Great Britain, the Federal Republic of Germany and in Italy since about 1954. New steel pipes are in many cases protected as they are laid. The use of high-quality, extremely thin steel pipes as well as more and more urgent calls for reliability and continuous readiness for operation have in many countries contributed to make cathodic protection a matter of course.

The study showed that by the middle of 1959 at least 50,000 km of gas mains with a surface of 90 mill. sq.m. had been cathodically protected throughout the world. The total intensity of cathodic protective currents of 110,000 A is equivalent to a direct saving of corrosion losses of 1,000 tons of steel per year. If this loss were to be spread equally over the whole surface, it would be practically harmless; but since corrosion in most cases creates holes, a few grams loss of iron often suffices to cause leakages, and a few kilograms lost suffice to render a pipeline absolutely useless.

It is noteworthy that the cathodic method can provide the means of protection for some 5 mill. tons of steel.

The report mentions the various agencies—engineering firms and manufacturers, metallurgical associations, government departments, and so on—which in the respondent countries undertake or supervise the work of protection.

Since by cathodic protection it is possible to achieve the highest resistance of new pipes to corrosion for the practically negligible expenditure of a few tenths per cent. of the pipeline costs, cathodic protection as a measure additional to protective coatings may in the future be expected to be increasingly used as standard equipment.

DISCUSSION

MR. J. DE VOOGD (Netherlands) stated that a special organisation had been established in his country to investigate and mitigate problems relating to the corrosion of pipeline and, as the result of recommendations made by this organisation, corrosion had been reduced, although success had not been achieved in all cases.

One problem had been that roots pierced protective coatings but it had been found that corrosion could be avoided by the addition of cathodic protection to the pipeline.

It had been established that current consumption was the yardstick of the effectiveness of the coating. He would like to ask two questions:

1. In view of the very extensive experience with cathodic protection of pipelines in the U.S.A., why were no data from that country included in the report?
2. What were the relative merits when using a copper/copper sulphate cell of obtaining potential difference by placing the cell directly over the pipeline as opposed to the 'remote earth' method?

M. R. DELSOL (France) stated that cathodic protection was very important for long distance high pressure transmission pipelines but was difficult to apply to linked distribution networks. He asked whether or not the methods of protection mentioned in the report as being used at present can be further improved.

MR. W. VON BAECKMAN replied that the length of pipelines which is cathodically protected is probably very much greater than the figure given in the report but figures are not available.

The reference electrode should be placed close to the

surface to be measured; this is difficult in practice because the pipe would have to be unearthed.

CZECH COKING PLANT GAS

Coke oven gas in Czechoslovakia accounts for 83% of the total gas production and is transported over long distances to feed local distribution networks. Its production is confined mainly to the Ostrava district where some 90% is made and the Kladus district which accounts for the remaining 10%.

Local distribution is at medium pressures but for long distance transport it is compressed at independent centres. For this latter purpose, the gas was partially purified and stored in dry MAN-type holders to be later treated over activated carbon for benzole and naphthalene extraction, followed by a final desulphurisation.

Increase in the use of gas has meant that additional quantities have had to be made available for compression which had made greater demands on the plants at collieries and steel works. This in turn has made necessary an alternative fuel for underfiring the coke ovens.

Underground storage facilities are also being exploited and in a suitable geological formation 90 km from the production plants such a structure with a potential capacity of 150 to 200 mill. cu.m. is being built.

The paper was introduced by MR. S. ODEHNAL, but there was no discussion.

GAS LEAKAGE DETECTION BY DOGS

Introducing the paper MR. VAN ISSELT said that this was a very economical way of making a leakage survey, because one man and one dog were able to test 600 km. of mains and services in six months.

He stressed the importance of having a good dog-handler. The detection of gas leakage is clearly of paramount importance and any means of improving existing methods or devising new ones is of interest.

Comparatively recently the idea of using dogs for this purpose has been tried and there exists a limited amount of literature on the subject.

It would appear that dogs were trained in America as long ago as 1948 and in 1955 an employee of the Utrecht gasworks suggested using a bloodhound to detect gas leaks. The paper discusses the training of two dogs in the Netherlands.

The selection and training of the dog is of supreme importance, so also is the choice of a good handler and the pair should be well matched. This method of gas leakage detection has the great merit of swiftness, reliability and cheapness.

There are disadvantages connected with the chief agents in this partnership being living creatures, but it would seem that advantages more than balance out the disadvantages.

DISCUSSION

M. R. DELSOL (France) said that many attempts had been made in France to adopt this method of leakage detection, but despite great enthusiasm he regretted that they had all proved complete failures; possibly this had been due to the handlers having starved their dogs with the object of making them keen to trace the leak, instead of being friendly with them.

MR. L. W. ANDREW (Great Britain) asked whether the dogs were too sensitive? Had it been an embarrassment to have found so many slight leakages by this means? How had the dogs been used in connection with leaks in houses? Had the dog detected an unknown leak from outside or had it been taken inside to locate a suspected leak?

MR. VAN ISSELT said that the number of leaks reported had not been an embarrassment. The serious ones were dealt with immediately and the slight ones were recorded and checked at a later date to ascertain if they had become any worse. The dogs went into houses because they smelt an unknown leak from outside.

This report was followed by a film showing the dog and handler in action.

The film, in turn, was followed by two Russian films in colour, the first showing pipeline construction with normal mechanised spread equipment but with examples of very difficult terrain and climatic conditions. The second was concerned with the application of PVC tape wrappings by field machines.

IGU SWEDEN—'Gas Journal' Abstract

----------SECTION 3

IGU/26-61 Calculation of the economics of long distance gas transmission systems.
Paper by H. Descazeauns, Manager of Gas Transport Services and J. Ramond, General Research Manager of Transport Services, Gaz de France.

IGU/26-61 Calculation of pipelines and the prerequisites for choosing optimum gas transmission conditions.
Paper by A. V. Alexandrov, B. V. Barabash and I. E. Khodamovich, U.S.S.R.

IGU/35-61 Economic diameters in pipeline systems at given supply and outlet pressures.
Paper by H. A. A. de Melverda, Netherlands.

IGU/45-61 Technique of gas line and compressor station construction in the U.S.S.R.
Paper by V. S. Turkin, U.S.S.R. Academy of Construction and Architecture, and A. N. Yuryshev, Engineer, U.S.S.R.

IGU/15-61 Supervision and regulation of a natural gas transmission system with particular reference to automatic mixing plants using multiple ultra-short wave frequencies.
A paper by A. Lazec and F. Huber, both of Niogas, Austria.

PIPELINE ECONOMICS

THE Chairman of this section was Mr. W. Wunsch, Germany.

The calculation of economic data for long-distance gas transmission systems, poses problems because it is impossible in such technico-economic studies to determine sufficiently precisely certain basic information for the particular transmission project.

Before finally deciding on a practical structure, widely varying combinations of some possibly characteristic values of the most weakly defined parameters should be

examined. The final choice would then be the best possible, as it is based on the examination of as large a number of alternatives as possible.

At first sight, electronic computation might seem likely to provide the best answer to such problems, in fact so far as complex transmission systems with dynamic objectives are concerned, computors will be needed for the calculations, but for elementary transmission systems with static objectives—unitubular, constant-output point-to-point transmission—Gaz de France has decided to use its own simplified mathematical method of rapid calculation.

This method determines, by simple functions of the physical and economic parameters derived from the data of the transmission system, the following optimum characteristics: (a) the economic maximum service pressure, P_o, (b) the economic recompression rate, r_o, (c) the economic diameter, d_o, and (d) the minimum total transport charges, S_o.

It has the advantage of clearly revealing by the calculation of errors, the influence of each of the principal physical or economic parameters on the different optimum characteristics of the transmission system. In this way when faced with a great number of alternatives to be examined, it is possible to decide with reasonable accuracy which alternatives may be abandoned or which should be investigated more extensively.

In determining the economic maximum pressure, P_o, calculations show that for a given gas its value is very sensitive to certain economic parameters and to the way in which the cost of the mains is expressed. The likely variations in P_o, however, within a fairly wide zone, do not appear to have any appreciable effect on the total transmission costs.

DISCUSSION

MR. W. WUNSCH, Germany, drew attention to the foreword by M. A. Bolzinger with which he was in agreement. The need to proceed intuitively when applying the calculation was the main theme of the report.

U.S.A. experience confirmed that no one formula yet covers all cases.

MR. J. STEINKAMP, Netherlands, asked, on behalf of an absent colleague, whether when calculating the annual charges it was possible to use the first year and last year instead of the middle year.

MR. H. DESCAZEAUNS replying, thanked the Chairman for his remarks and agreed that the report set out the results of a study to find new and easy means to simplify the work of calculating long-distance transmission system economics.

MR. W. WUNSCH made the point that long-distance systems were dynamic, not static, and therefore static solutions could not be applied.

OPTIMUM TRANSMISSION CONDITIONS

The importance of pipeline calculations involving the determination of the optimum gas transmission conditions is perhaps greater in the U.S.S.R. than in any other country and this paper discusses the ways and means used by the Russian engineers to accomplish this.

Modern gas mains being expensive and metal-consuming, their design to ensure minimum expenditure on construction and operation demands a precise calculation of pipeline capacity and the analysis of interdependent basic parameters, such as the diameter and wall thickness, the initial pressure, rate and power of compression, and the distance between compressor stations.

The same care is necessary in the evaluation of associated parameters, such as the flow resistance factor, the gas compressibility factor and gas temperature. To arrive at an exact formula, the topography of the pipeline must also be taken into account if it is to be laid over rugged terrain.

Modern methods for calculating gas pipeline data are based on steady gas flow, but in reality, the flow is disturbed, especially in the last sections of the pipeline, where there are variations in gas consumption, so particular attention has been paid to the scientific investigation of non-steady conditions of gas flow, and equations relating transmission changes of gas pressure and throughput with time have been obtained. The difference between theoretical and experimental results does not exceed 2% for pressure and 8% for throughput. Solid or liquid suspensions in the gas considerably influence the transmission capacity, and an attempt has been made in this paper to give a theoretical estimate of their influence.

The analysis of interdependent gas pipeline basic parameters given in the paper, both in mathematical and diagrammatic form, makes it possible to find the optimum conditions needed. In particular, the use of pipes with wall thickness equal to .01 diameters permits a reduction of 5% in the amount of metal used while retaining the specific power of compressor stations constant, or, by diminishing by 12% the total specific power, the same amount of metal may be saved.

MR. W. WUNSCH, Germany, commented that large diameter pipes used in long distance transmission had the advantage of providing additional storage.

He asked whether 1,400 mm. pipes could be handled satisfactorily in practice; he had a very high opinion of the technical ability of the U.S.S.R. engineers, but he thought that repairs to these large pipes might present difficult problems, especially where they were deeply buried.

This disadvantage may have to be taken into account in arriving at the economics of their use.

He made the point that the relation between the prices of different materials and between material costs and power costs varied from one country to another and that an economic solution for one country was not necessarily the economic solution for another.

All calculations had their limitations and small changes in price could make considerable change in the optimum solution.

MR. H. A. A. DE MELVERDA, Netherlands, suggested that because of the fluctuations which occurred in prices of materials as between one country and another it was desirable to evaluate all material costs in terms of labour units. He wished to stress the importance of overall economics.

MR. W. WUNSCH thought that many of these details would have to be worked out by the new committee of the IGU which is to study the transmission of gases.

MR. R. FORT (France) said that different prices in different countries led to the adoption of different criteria.

MR. J. RAYMOND (France) observed that different results were obtained due to the adoption of different criteria.

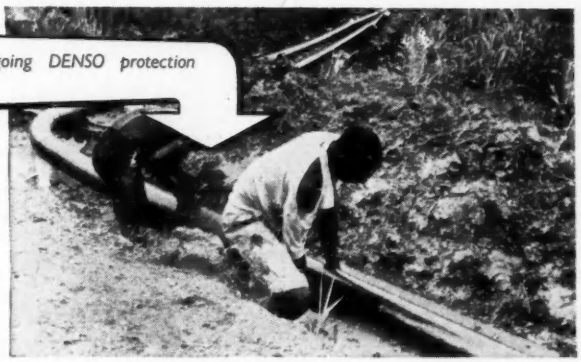
In one case the primary aim may be to attain minimum overall cost, in another case it may be to attain minimum weight of steel consistent with a low, but not necessarily minimum, overall cost. (As appears to be the case in the U.S.S.R.)

MR. W. WUNSCH pointed out that flow was not necessarily constant; for example, there was often a fluctuation between weekday and Sunday rates of flow. The Russians had made an attempt to allow for these dynamic factors in their calculations.

ECONOMICAL DIAMETERS

The study of pipeline characteristics is becoming increasingly important and the subject of this paper is a pipeline consisting of several sections, at the end of each of

DENSO *fights* CORROSION



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which there is an outlet or an additional supply; pressures at the beginning and at the end of the pipeline are assumed to be given, but without any recompression. The paper has as its object an investigation into the conditions of minimum investment.

There is always an optimum and one principal condition, which is that the diameters of the consecutive parts of a pipeline must be proportionate to the desired capacities of these parts raised to a certain power. Each diameter can be computed from a formula, so also can the optimum investment.

The proportionality rule can lead to diameters of any value, so a correction must be applied to find practical diameters which are a multiple of (one or) two inches. Such a correction will cost as a rule less than a 5% additional investment.

The paper discusses further conditions of pressure, and a formula is given for the computation of intermediate pressures. Finally, the effects of branches on optimum conditions are considered.

An interesting point made in this paper is that the literature on the subject has often referred to problems of economical diameters, when it has really meant economical pressures, so this is almost the first time this particular field has been treated as the subject for an investigation in its own right.

DISCUSSION

MR. W. WUNSCH, Germany, said the author had taken a point of departure which was very simple and had then developed his theory. There were, however, many practical limitations which affected the ultimate selection of pipe diameter.

He thought that many points in this report which would have come up for discussion had already been covered to a considerable extent by the discussions on the two preceding reports.

PIPELINE CONSTRUCTION TECHNIQUES

Every year sees an extension of the pipelines laid in the U.S.S.R., and this vast construction programme involves work being carried out in very varied terrain under extremes of climatic conditions.

The standards and specifications regulating their construction are systematically revised to keep them abreast of current developments in engineering techniques, and their design has been modified to make tensile rather than yield strength of steel the main criterion of pipe quality, which has resulted in a saving of metal.

Carried out by specialised contractors working under the guidance of the State Gas Industry Department, GLAVGAS, the work involves assembly line production methods, and the various operations are highly mechanised. For clearing and grading the rights-of-way specialised equipment is used, and during the winter at sub-zero temperatures, special techniques and machinery must be available.

Automatic welding machines employing the submerged-arc or CO_2-shielded arc technique are used, and to cut down welding over ditches, pipes are triple-jointed in semi-permanent yards; the quality of welds is controlled by magnetographic flaw detectors or by gamma-ray radiography.

For protective coating asphalt-based enamels are used, but lately, self-adhesive plastic tapes have become available; extensive experiments have been made in mill coating pipes with silicate enamels and plastics. Coating is supplemented by cathodic protection and electric drainage.

Buildings are constructed of prefabricated frame and cladding sections. The standardisation of constructional sections, and of whole buildings, has made possible improvements in the general layout of compressor stations, and reduced the number of station buildings. Extensive use has been made of aluminium-alloy frames covered with asbestos-cement sheets and stuffed with mineral wool.

As the scale of pipeline construction increases, scientific, planning and constructional organisations are working on a great number of technical, managerial and economic problems. Their aim is to improve the quality of steels, pipeline welding methods and the prevention of corrosion. New and better designs and building techniques are being sought with the ultimate objective of raising the level of mechanisation of pipeline construction and reducing its cost.

DISCUSSION

MR. W. WUNSCH, Germany, said it was remarkable that two reports from the same country should be presented at the same session; it proved how much interest is shown in the U.S.S.R. in the solution of technical and economic problems.

There had, of course, been the most remarkable development in the consumption of gas in the U.S.S.R. and therefore in pipeline development. (For instance there was mention of two parallel lines 2,060 km. in length.)

The information about wall thickness, welding control and protective coatings was of great interest. Synthetic plastic coatings were more expensive than coal tar and glass fibre but had very good adhesive properties.

Apparently the U.S.S.R. engineers when determining the wall thickness of pipes made no allowance for corrosion, as has been the general practice in many other countries. In Western Germany they had allowed for some corrosion but advances in coating materials and methods of application and in cathodic protection may make this allowance unnecessary in the future.

As distinct from much of the terrain in the U.S.S.R. there was difficulty in laying high pressure pipelines in many parts of Western Europe due to the many built-up areas through or near to which the route had to be taken.

He was impressed by the high degree to which the laying of pipelines in the U.S.S.R. had been mechanised and, in particular, the extensive use being made of the relatively new technique of automatic welding machines in the field.

MR. H. GEILENKEUSER, Germany, appeared to doubt whether design calculations based on tensile strength was an advance. The resultant thin walled tube did not allow sufficiently for distortion, and distortion had to be avoided.

CONTROL BY VHF RADIO

The last paper of the session came from Austria, in which the authors described the system of controls designed for the natural gas distribution main laid during a period of three years after the departure of occupational forces in 1955.

Special VHF equipment designed by Niogas, the gas transport company in Lower Austria, serves both plant control and the operation of the entire high pressure network.

Pressure reducing stations are entirely automatic, and the pressure operating conditions are transmitted by radio. The system of telemetry was imposed on the network after completion, and so certain anomalies appear.

Information is transmitted intermittently by each enquiry cycle taking ten minutes. During this period information is collected in an integral apparatus and relayed to the central control room at the end of the period.

Alarm signals at pressure reducing stations and gas/air blending plants are transmitted both to mobile and stationary radio sets.

Technical developments

Pivoted disc valves

THE Winn Flexiseat pivoted disc valve has a maximum working pressure of 150 p.s.i. and a maximum working temperature of 212°F. This valve is particularly adaptable for automatic operation by pneumatic, hydraulic and electrical control, including automatic positioning where required.

Extremely low operating torque allows reductions in size, power and cost of actuators.

The Flexiseat valve has excellent flow characteristics. The seating surface is spheroidal, and is off-set for the centre line of the spindle, combining both angular and axial movement in its closing action; this gives positive compressive seating over the entire periphery.

The seat is adjustable and is made of a tough material of high flexibility bonded to a rigid metallic core. It is locked in position by a screwed retaining ring which provides axial adjustment to position the seating surface accurately in relation to the disc.

The resulting spot tight closure can be maintained over a long period of service.

The range of standard sizes is from 3 in. to 24 in. although sizes over 12 in. are usually made to order to suit particular applications.—*B. W. Valve Co. Ltd.*

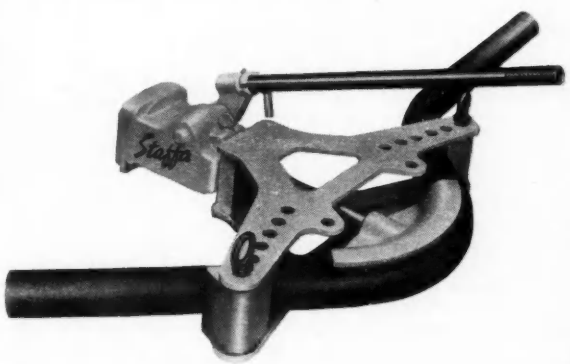
Three-point pipe bender

A NEW British-made, hydraulic three-point bending machine has been introduced into the Staffa range of pipe, bar and section benders.

The machine, which is sturdy and of robust construction, bends nominal bore steam and gas pipes up to 1½-in. diameter.

The bender, which has been designated the B2 and which does not require a bench or stand, consists of a powerful hydraulic pump ram unit, a forming head assembly and centre formers for ½-in. to 1½-in. nominal bore pipes to BSS.1387.

The whole assembly complete in a wooden case weighs only 110 lbs. and a particular feature of the machine



is the angle of bend indication marks cast in one end of the formers which provide a useful guide during the bending operation.

The machine is much faster than any screw type bender and a full 90° bend can be made in 1½-in. pipe in 60 seconds.—*Chamberlain Industries Ltd.*

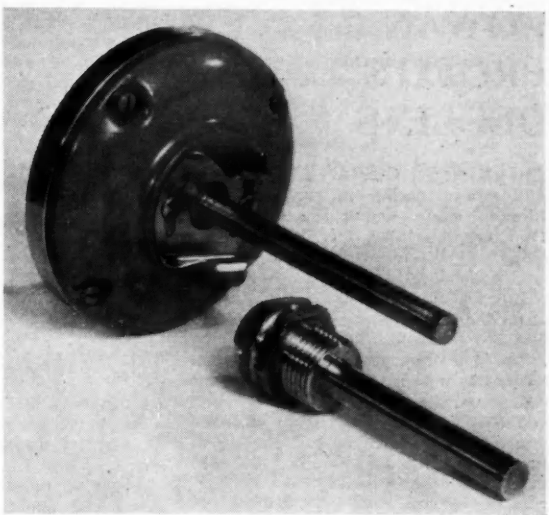
Thermometer modification

A TIME-SAVING modification for users of their bi-metal horizontal and vertical pattern industrial thermometers has been introduced by The British Rototherm Co. Ltd.

The modification consists of a strong adjustable steel spring clip secured on the base of the instrument. The clip firmly grips the body nut, eliminating entirely the gland and gland nut and the need for a spanner.

The clip has a non-tarnishable finish.

The modification is available for use with or without



separable pockets. It greatly facilitates the fitting or removal of the thermometer.

For heating and similar liquid installations where the pocket is fitted permanently, the clip enables the instrument to be quickly attached or removed without draining the system.

The clip modification is available for instruments in all standard temperature ranges in 2½-in. and 4-in. dial sizes.—*The British Rototherm Co. Ltd.*

Smith 12 derricking unit

A NEW independent high-speed derrick unit and a new swing brake are now available for the Smith 12 excavators and crawler cranes.

These two units will enable the crawler-mounted machine to hoist, slew and derrick simultaneously, and, if used in conjunction with the special planetary-load-lowering drum unit which is also available, will complete the equipment for transforming the 12 into a sensitive precision crane.

All this equipment is now available in the form of optional extras on new machines.

The derrick unit comprises a totally-enclosed worm-driven drum unit which is powered from the first machinery shaft by spur gearing through a pair of friction clutches, all encased and using the basic machinery oil flow for lubrication.

The hand-operated swing brake is fitted to the first-machinery-shaft clutch disc, which controls the drive to the slewing motion. This brake is of twin-shoe construction, operated by overcentre control, is very light in operation but is sufficiently powerful to hold the machine on any slope.—*Thomas Smith & Sons (Radley) Ltd.*

NEWS SUPPLEMENT

Gas makes a 'useful though modest' surplus

THE gas industry made what the Chairman of the Gas Council, Sir Henry Jones, called 'a useful, though modest, financial surplus' during the year ended March 31.

Sir Henry, who was speaking at a London reception, said that although the weather had been warmer than usual, sales of gas had increased by about 2½% during the period and were thus a record 'high.'

The financial surplus was earned by the industry as a whole.

A deficit of £2,376,521 was shown in last October's annual report for the year ended March 31, 1960, compared with a deficit of £1,466,882 in the previous year.

PARKINSON COWAN PROFITS DECLINE

PARKINSON COWAN LTD. suffered a serious decline in profits for the 15-month period ending March 31. The Directors state that this decline, compared with the 12-month period of 1959, is wholly attributable to the severe change in fortune of their domestic appliance division, which made a record profit in 1959 and a loss in 1960/61.

The Directors state that the other manufacturing divisions of the Group, taken together, performed much better in 1960/61 than in the previous year, and that the newly-acquired business of Bastion and Allen Ltd. recorded a very satisfactory year's trading.

PROSPECTS

The prospects for the Company's domestic appliance operations in the current year are uncertain, but the Company is engaged in negotiation to widen the base of its operation in the industrial heating field. If these negotiations are satisfactorily concluded, the Group will be less dependent upon the appliance business.

The Group trading profit for this period was £307,301 against £728,438 in 1959. The profit before tax was £53,352 against £550,558, and the net profit was £47,648 against £281,184.

The shareholders will be asked to approve a Final Dividend of 6¼% less tax, which together with the Interim of 5% less tax, will give a total Dividend of 11¼% for the period.

Methane Tanker Finance

METHANE TANKER FINANCE has been registered as a private company with an initial capital of £100 to carry on the business of shipowners, says *The Financial Times*.

The Gas Council's scheme envisages two refrigerated tankers of about 11,000 tons capacity, capable of carrying 700,000 tons of liquid methane a year.

£100,000 rail bridge pipeline award

A CONTRACT worth approximately £100,000 has been awarded to Taylor Woodrow Construction Ltd. by the Scottish Gas Board to lay a pipeline to convey gas supplies more than two miles across the famous Tay railway bridge, Dundee.

The contract, on which work began recently and which is due for completion by the end of October, includes the engineering design and construction of the pipeline.

This will be 12¾-in. outside diameter of high-pressure welded steel.

The pipe will be placed inside the approach bridge structures but cantilevered on brackets outside the main high level spans.

SOUTHERN GAS SALES STILL IMPROVING

THE improvement in gas sales in the Southern Gas Board area has continued, despite mild weather in January, February and March. The most encouraging trends were in sales to domestic and commercial users, states the Quarterly Bulletin to the Southern Gas Consultative Council.

All appliances shared in a drop in sales of 30% compared with the same period last year. The decrease was almost entirely in hire purchase sales and in the same period, cash and credit terms sales increased by 14%.

At Southampton, modifications to carbonising plant are in hand to improve efficiency and increase production of Gloco. A new ammoniacal liquor plant there is almost completed.

Work on the King's Meadow site at Reading has made good progress, the virgin naphtha tanks have been completed and tested, weighbridges have been installed and the terminal pits at the ends of the thrust bores carrying service pipes between the works and the site are under construction.

Unique gas grid control system

AN order for the supply of equipment which will enable a large number of points at the major holder stations of the North Wales gas grid to be monitored and controlled from a new operations room, which will be set up at Rhyl, has been obtained by Pye Telecommunications Ltd., in conjunction with George Kent Ltd.

A total of 96 alarms, eight control functions and 28 measurements from ten holder stations will be transmitted to the required points over Duplex U.H.F. radio links via a radio-repeater station—Great Orme's Head, Llandudno.

These functions will be displayed and printed-out at regular intervals or on demand. Alarms will also report during quiescent periods. Control settings can be adjusted in 4% steps and a closed loop control at each holder station will then maintain flow to the set value.

The complete system, apart from existing pneumatics, is designed to operate from 24 volt D.C. batteries, trickle charged from the mains supply. The radio equipment comprises main and standby units with automatic changeover facilities. The system can readily be extended to include all other stations within the grid network.

This comprehensive telemetering system is in accordance with the specification issued by the Joint Advisory Committee of the Nationalised Fuel and Power Industries, 1961.

CORRESPONDENCE

THE LANGUAGE PROBLEM

DEAR SIR,

Your 'Impressions of Stockholm' and report of the Eighth International Gas Congress make very interesting reading, especially the impressions.

I was interested in your remarks about the arrangements for dealing with the language problem, which exists at practically all international gatherings, in spite of the widespread use of English today.

This letter is to draw your attention to an international congress which will take place in Harrogate from August 5 to 12, 1961, at which there will definitely be no language problem. More than 1,500 will attend from at least 34 countries.

At these congresses, held each year in a different country, there is a summer university with a panel of distinguished speakers on specialist subjects, many of them technical. This year it is to be an 'Artfestival Congress,' and the speakers will be: Two French professors, a Jugoslav international lawyer, a Scots poet, a Jugoslav explorer and a Japanese professor, all speaking on various arts.

Apart from the business sessions, general and sectional, there will be theatre, films, concerts, youth section, children's congress, visits to places of interest, international ball, and an official reception, with lots of talking between people of different countries. All this will be without earphones or interpreters, and everyone will understand and be able to speak—in one language—Esperanto.

The congress will be that of the 'Universala Esperanto-Asocio,' with members all over the world. My wife and I will be there, for the seventh time.

The effort necessary to master this language is reasonable, compared with trying to learn all the other things in life, and well worthwhile. Why it is not put to more use is one of the enigmas of this modern world.

Yours truly,

John Brownlee, A.M.I.GAS E.

11, Shaftoe Crescent,
Hexham,
Northumberland.

'OF CABBAGES AND KINGS'

DEAR SIR,

I would respectfully draw your attention to the article in the 'GAS JOURNAL' dated July 15, 1961, entitled 'Of Cabbages and Kings' by G. le B. Diamond.

Under the heading 'A Hot Letter,' the statement that the cooker was made by Sydney Flavel is incorrect, as this equipment was designed by the under-signed and constructed and erected in the appliance workshops of the old South Metropolitan Gas Company by Mr. W. Staples, an employee of the Company.

The cooker was unique in design, being completely externally gas-heated, economical in use and of pressed steel construction with a cast iron front. The oven itself was withdrawable in order that it might be taken to the sink for cleaning.

The method of heating was patented and held by the South Metropolitan Gas Company and myself.

Yours faithfully,

C. Spavin.

Torphins,
Park Road,
Limpsfield,
Surrey.

Leicester City Council are to instal gas space heating in 88 of the 259 new dwellings which they are to build on their Thurnby Lodge Estate.

OBITUARY

MR. W. ARNOLD JACKSON, until 1952 chairman and managing director of Sidney Flavel & Co. Ltd., has died at the age of 66. Before the first world war, Mr. Jackson worked with the Thermal Syndicate, which Company he rejoined in 1919. He left the Thermal Syndicate in 1933 to join Sidney Flavel as Northern representative. He was appointed to the Board of the Company in 1942 as general manager.

MR. G. E. SANDLAND, of the International Nickel Co. (Mond) Ltd., has died, after having been with the Company for 35 years. Mr. Sandland played a major part in the progress of the Development and Research Department, and was engaged upon the first issue of the Nickel Bulletin. After the second world war, he rejoined the Publicity Department, and was recently working on the nickel plating labelling scheme.

DR. E. HAMMOND, technical manager of Lafarge Aluminous Cement Co. Ltd., has died after being in hospital for several months. Dr. Hammond was well-known to many of the company's clients, stockists, agents and business friends, either personally or through correspondence. His colleague, MR. E. DAVISON, has been appointed Acting Technical Manager.

Board puts up gas prices

MORE than 750,000 Eastern Gas Board Consumers will pay increases—amounting to 5d. or 6d. a week for the average user—on their gas bills as from meter readings after July 29.

This was announced by the Chairman of the Board, Mr. J. H. Dyde, this week.

During the past year the Board has been faced with increases in net coal costs, wages and salaries amounting to nearly £500,000. The increases are expected to produce about £900,000 a year.

PERSONAL NOTES

MR. D. F. CAMPBELL, Chairman of Davy-Ashmore Ltd., will retire from the Board in September. Mr. Campbell joined the Board of Davy Brothers Ltd. in 1935 and became chairman of its successor, Davy-United, in 1944. Upon the merger with Power-Gas Corporation in 1960, Mr. Campbell agreed to continue as Chairman of Davy-Ashmore Ltd. during the transition period. MR. M. A. FIENNES will succeed Mr. Campbell as Chairman and MR. L. H. DOWNS will become Vice-Chairman. Mr. Fiennes is Group Managing Director of Davy-Ashmore Ltd. and will continue in that office. While remaining Chairman of Davy and United Engineering Co. Ltd., Mr. Fiennes has now relinquished his appointment as managing director of that Company and MR. M. F. DOWDING has been appointed in his place. Mr. Dowding is already a Director and was formerly general manager of the Machinery Division. MAJOR W. R. BROWN, a former Chairman of The Power-Gas Corporation Ltd., retired from that Board before the merger in 1960, but joined the Board of Davy-Ashmore to assist during the transition period. He will also retire in September but will remain a Director of Ashmore, Benson, Pease & Co. Ltd.

MR. A. H. EDNEY, General Publicity Manager of the Radiation Group, has been appointed Chairman of the Incorporated Advertising Managers' Association. Mr. Edney serves on the Council and Executive Committee of the Advertising Association, and was recently appointed a Director of the Association's Services Division, which is concerned with Education, the Harrison Library, Overseas Advertising and Marketing, Research and Statistics. He is also a member of the Executive Committee of the Incorporated Society of British Advertisers.

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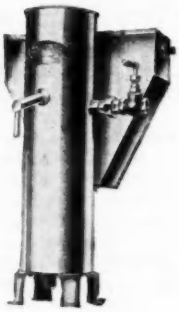

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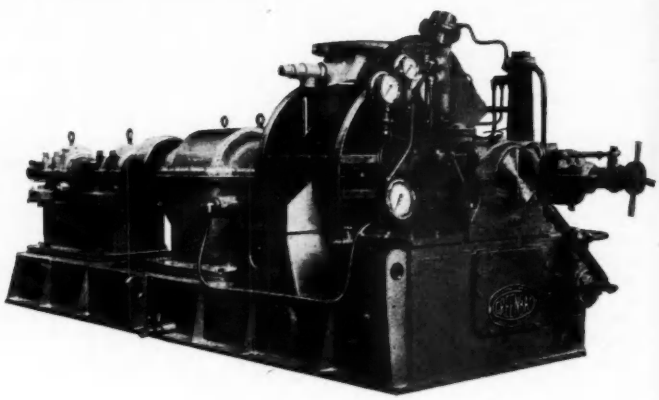

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